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CHUBS' NESTS

ALFRED W. G. WILSON

DURING late summer, at times of low water on almost any one of the numerous small streams tributary to the Upper Ottawa River, the passing voyageur cannot fail in having his attention drawn to curious conical piles of coarse gravel and pebbles which occur along the river shores. Locally these piles of stones are called "Chubs' Nests." The following notes are published in the hope that they may prove of interest to American Naturalists.

The accompanying plates will give a general idea of the shape and character of these heaps of stones. They are conical in form, with a circular or oval base. The volume of the gravel of which they are built will vary from a good sized wheelbarrow load to about a cart load. The individual pebbles vary in size; the great majority would readily pass through a two inch ring. In a few cases oblong pieces of schist about three inches in length were noted but their cross section would not be more than one square inch. The largest pebbles used in the construction of the heaps would weigh at least half a pound each; most of the pebbles would weigh less than four ounces each. The rock material from which the pebbles have been derived is often quite different from the rock of the immediate vicinity, showing that the pebbles have been transported some distance to their present resting place. In a number of instances it was found that the interior of the heap consists almost entirely of small pebbles less than an inch in the maximum dimension, the larger ones forming only an outer layer over the whole cone.

The dimensions of two of these heaps of stones were as follows: —
No. 1. Base, length 6.5 feet, width 5 feet at one end (left of figure 1), and 4 feet at the other, height 21 inches, angular slope of the side of the cone about 48° to the vertical. This pile was built of mixed pebbles, chiefly granite and schist. (See figure 1.)

No. 2. Base, nearly circular and four feet in diameter, height 22 inches, angular slope $49^{\circ} 45'$. (See figure 2.)

In a very large number of cases examined the stones were found to be piled quite loosely so that the slightest jar set them sliding down into a position of more stable equilibrium.

Along the larger streams and rivers the heaps are usually found in small bays off the main stream or on bars and ridges on the sides of the main channel, in quiet but never in dead water. In some places near the watersheds they occur in midstream, and occasionally they are sufficiently numerous to hinder and partly obstruct canoe navigation, where the water is shallow and the stream narrow.



FIG. 1.

In the early spring when the waters are high and usually more or less turbid the cones are not in sight; but as the waters recede the apices of the cones gradually appear above the surface and late in the season the water may have receded so that the whole cone together with the bar on which it was built comes into view. The tops of the "nests" shown in figures 2 and 3 were fully five feet above the surface of the water when the pictures were taken in August. In early June the water was probably six feet higher and the tops would have been under at least a foot of water.

As to the origin of these curious heaps of pebbles, the Indians

and Bushmen all attribute them to small fish — called *Chub* by the whites and *Awadosi* (stone carriers) by the Indians.¹ Personally I have made numerous inquiries but I have not been able to find any one who will say he has actually seen the fish at work, still they all insist that it is the fish who make them. A careful examination of over one hundred heaps, scattered along a line of gravel more than three hundred miles in length has convinced the writer that the cones are of animal origin, that the materials have been assembled by some intelligent agent, not by stream action.

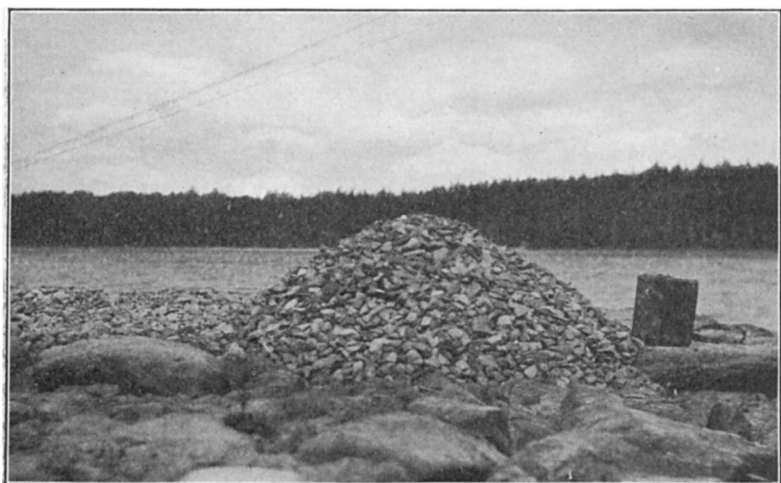


FIG. 2.

These heaps of stones are said to be built in the early spring and are presumably used for spawning purposes. They are always in places where the water is smooth but still flowing. Except in the very beds of the rivers of this north country, pebble and gravel beds and bars are not found. The shores of the streams are almost universally clay. At high water the rivers expand and invade the woods so that, as one of my canoemen expressed it "The pike go into the bush to hunt." In midstream the water is usually flowing very swiftly at high water and along

¹ Bell, Robert. Recent Explorations to the South of Hudson Bay. *The Geographical Journal*, July, 1897, p. 16.

the shores the ground is covered with logs and bushes. Ground suitable for spawning covered by a moderate depth of water is rare. In nearly every case where the nests were seen the bottom consisted either of large boulders and cobbles, or of soft materials and sand with a certain admixture of partly decayed logs and lower types of plant life, chiefly algæ. On this bottom the conical heaps of stones were built up. It seems not unnatural to suppose that they serve the dual purpose of offering a clean gravel surface for the deposition of the eggs, and at the same time raise these eggs nearer the surface of the water and thus into a zone of more



FIG. 3.

light and warmth than if they were deposited directly upon the bottom.

The fish which are said to be the architects of these curious nests vary in size up to about 18 inches in length, and in weight up to about two pounds or a little over. Their ventral aspect is white, the dorsal dark gray-black, and the broad sides are silver white. The cycloid scales are large and thick, and the body is about three times as deep as wide. The third plate shows a specimen about 14 inches in length which was captured and laid upon the nest before making the picture. President David S. Jordan to whom these data have been submitted considers that

the fish is "probably the Silver Chub or Fall Fish, *Semnotilus corporalis* Mitchell." It may be interesting to sportsmen to know that the fish rise readily to the fly, occasionally can be caught with a troll, and are easily captured with an ordinary hook baited with a piece of bacon rind. The flesh is coarse and the bones are few and large, reminding one of mullet.

In 1844 Chubs' nests were found in the Magalloway River, Maine, by Dr. Jeffries Wyman. He described them to the Boston Society of Natural History (Proceedings, Vol. 1, p. 196) as "mounds of pebbles, two or three feet in diameter, which he was told were heaped up by a fish called the Chub, at its breeding season, and that its eggs were deposited among the stones." He referred to a similar habit attributed to the lamprey eel and remarked that he was not aware of any other instance of the kind.¹ Dr. Robert Bell, in the report of his explorations referred to above, has published a figure of a characteristic nest. He states that a varying number of chubs work together in building a mound, bringing the stones in their mouths, one at a time, from far and near.

In considering the relative sizes of the pebbles and the fish that move them, it must be remembered that under water the weight of the stones will be from one quarter to one third less than the weight in air. In the cases of the larger heaps of stones it is often found that there is an area greater than the base of the cone over which the stones are scattered. In one case we found what appeared to be the base of an old cone and the inference seems to be that in the rebuilding every spring they repair the old nests, shift them at times, and utilize materials from abandoned nests to construct new ones or to enlarge the old. The larger nests are probably the work of several seasons.

MONTREAL, January, 1907

¹ The nests of the lamprey are "gravel filled pockets." "The central part is usually 15 to 20 cms. deeper than the edges, so that the whole is dish-like in appearance; at the lower edge there is always a pile of stones." The stone carrying habit of the lamprey has been described by S. H. Gage, by Dean and Sumner, and by Young and Cole (*American Naturalist*, 1900, vol. 34, pp. 617-620). In an interesting and comprehensive account of parental care among fresh water fishes (*Rep. of the Smithsonian Inst.*, 1905, pp. 402-531) Theodore Gill does not include either the lamprey or the chub, the former presumably not being considered a fish. The cat-fish is described as carrying stones *away* from its nest; no stone gatherer like the chub is mentioned.